GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Low-level aerial photogrammetry, PG_00053257
Field of study	Geodesy and Cartography

Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
Education level	first-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	6	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Burdziakowski
	Teachers	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	E-learning hours included: 0.0						

Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
	Number of study hours	45	5.0	25.0	75

Subject objectives	The purpose of the course is to teach how to take photogrammetric measurements from unmanned aerial platforms, how to operate photogrammetric software, and how to interpret the results.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W07] has a well-established knowledge and understands concepts in the field of engineering geodesy including the use of calculations and measurements methods carried out with the use of geodetic instruments and photogrammetric and remote sensing technologies related to geodetic support for investment, surveying and inventory measurements and photogrammetry with remote sensing	Has knowledge of the technological cycle of low-altitude photogrammetric development.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_U04] can use contemporary geodetic instruments, including automation of measurements, data transmission and processing in a computer-instrument system with the use of computer networks	Knows the elements of a photogrammetric study, understands the study parameters and understands their impact on the result.	[SU1] Assessment of task fulfilment
	[K6_W01] has basic knowledge and understands the concepts of physics which allow to use optical and immersive instruments as well as positioning and satellite imaging	Able to carry out a photogrammetric study from a low ceiling, according to the process cycle.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	The course content includes the following topics: - Introduction to low-altitude photogrammetry + history - BSP in low-altitude photogrammetry (advantages, disadvantages, purpose) - Functional load - The technological cycle of photogrammetric development, including: - Preparatory work - Field work - Development of images - Products of NP photogrammetry. - Assessment of the quality and accuracy of photogrammetric development - Use of basic NP photogrammetric products. - Other NP photogrammetric studies, including case studies: - Current law on photogrammetric studies in Poland.
Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Preparatory documentation	80.0%	40.0%
	Photogrammetric work	80.0%	40.0%
	UAV characteristics	80.0%	20.0%

Recommended reading	Basic literature	• Drony Wiktor Wyszywacz • Fotogrametria - Zdzisław Kurczyński - PWN • Opracowania fotogrametryczne z niskiego pułapu / Michał Kędzierski (red. nauk.), Anna Fryśkowska, Damian Wierzbicki. • https://www.agisoft.com/pdf/metashape-pro_1_8_en.pdf • https://www.agisoft.com/support/tutorials/beginner-level/ • https://www.bentley.com/pl/products/product-line/reality-modeling-software/contextcapture • https://support.pix4d.com/hc/en-us/articles/360031682092-PIX4Dmapper-video-tutorials
	Supplementary literature	Richard Hartley and Andrew Zisserman. 2003. Multiple View Geometry in Computer Vision (2nd. ed.). Cambridge University Press, USA.
	eResources addresses	Adresy na platformie eNauczanie: Fotogrametria niskiego pułapu (2024/2025) - Moodle ID: 44551 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44551

Example issues/ example questions/ tasks being completed	Laboratory Block 1: Laboratory Issues (4h): - Selecting a non-metric camera for a task - Designing the flight altitude for a given GSD - Designing the longitudinal and transverse coverage - Designing a flight plan for the above data - Making sketches and flight plan - Characterization of the BSP for photogrammetric measurement Laboratory block 2 - Development of preparatory documentation - Laboratory topics (4h) - Development of preparatory documentation: - Analysis of terrain and adjacent space - Location of photogrammetric matrix - Objects affecting the implementation of the mission - Characteristics of the measurement task and accuracy parameters - BSP and camera characteristics - Location and signaling method of photogrammetric matrix points - The method of image processing - Format of the resulting data - Sketch Laboratory block 3 - Software operation: Laboratory issues (7h) - Software operation: - Agisoft Photo Scan - Pix 4D - Bentley Contex Capture - Manual PIX4DPlik - Bentley Context Capture Tutorial - Photogrammetric development
Work placement	Not applicable

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